

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

RECEIVED
CENTRAL FAX CENTER

SEP 29 2005

Applicant: Smith, et al. Docket No.: 2001 P 11900 US01
Serial No.: 10/786,996 Art Unit: 1746
Filed: February 25, 2004 Examiner: Markoff, Alexander
For: Method of Removing PECVD Residues of Fluorinated Plasma Using In-Situ H₂ Plasma

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Declaration Filed Under 37 C.F.R. § 1.132

Dear Sir:

1. I am a Process Integration Engineer working at Infineon Technologies AG in Richmond, VA.
2. I have the following degrees: BS Chemical Engineering 1993 from the University of Virginia and MS Chemical Engineering 1998 from North Carolina State University.
3. I have worked in the semiconductor industry for 10 years. During this time I have been an author on 3 papers on the topic of semiconductor processing printed in peer-reviewed scientific journals and made a presentation at an American Vacuum Society technical conference.
4. I have reviewed and understand the process disclosed in U.S. Patent Application No. 10/786,996 ('996 Application).

BEST AVAILABLE COPY

2001 P 11900 US01

Page 1 of 3

5. One of ordinary skill in the art would understand the '996 Application to disclose a method of removing AlF_3 residue from within a process chamber by chemical reaction. The embodiment disclosed in the '996 Application uses hydrogen plasma in accordance with the determined process conditions to remove the AlF_3 residue. A gas mixture of hydrogen and a carrier gas (e.g., helium) is first introduced to the chamber in order to strike a plasma. Then, in a second step, H_2 is introduced in accordance with the determined process conditions. Optical emission spectroscopy or actinometry are diagnostic techniques used to determine the process conditions that maximize the hydrogen concentration within the chamber.

6. One of ordinary skill in the art would understand that the optical emission spectroscopy or actinometry determines the approximate process conditions that maximize the hydrogen atom concentration based upon the relative emission from excited hydrogen and an inert gas acting as actinometer (e.g., argon atoms).

7. One of ordinary skill in the art would understand that the process conditions that are commonly used to alter the concentration of a chemical species in a plasma processing chamber include flow rates, pressure, and RF power.

8. One of ordinary skill in the art would further understand that gases other than helium and argon (the inert gases explicitly mentioned in the specification) may be used to strike or initiate a plasma. In particular, one of ordinary skill in the art would understand that another inert gas or combination of gasses may be used to strike or initiate a plasma according to the design of the process chamber and associated equipment.

BEST AVAILABLE COPY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Date: 9/28/2005

Buddy C. Smith

BEST AVAILABLE COPY